STATEMENT

EARLY OBSERVATIONS OF TSUNAMI EFFECTS ON MANGROVES AND COASTAL FORESTS

Statement from the IUCN Forest Conservation Programme

Gland, Switzerland, 7 January 2005 (IUCN) – With the human toll of the Indian Ocean tsunami disaster rising to over 150,000 people, IUCN and its staff and field offices all across the region are still actively engaged in supporting the ongoing relief and rehabilitation effort. This remains the priority at the moment. While it is too early to provide any comprehensive assessment of the ecological impact of the tsunamis on coastal ecosystems, early evidence suggests that mangroves and other coastal forests may have played a crucial role in saving human lives by breaking the devastating impact of the incoming waves and acting as the first line of defence. Preliminary reports from IUCN field staff involved in emergency relief operations in Sri Lanka and from IUCN members and partners in the impacted region show that coastal areas which had dense mangrove forests, mature shelterbelt plantations and other substantial vegetative cover, suffered fewer human losses and less damage to inland property and built infrastructure than those areas where the coastal forest ecosystems had been degraded or converted to other land use. The Indian Ocean tsunami tragedy has once again powerfully brought home the rationale for conserving and sustainably managing natural ecosystems while pursuing economic development. While the earthquake and the consequent tsunami that it generated were entirely natural events themselves, indiscriminate conversion of natural shorelines and mangrove forest ecosystems for shrimp farming, urban settlements, tourism development and other often unregulated and unplanned human activities over the past several decades left the coasts of the region and its inhabitants much more vulnerable to the immense destructive force of the tsunamis. It will be important to keep this in mind while planning and moving ahead with the reconstruction effort.

Importance of mangrove and coastal forests

Found in the inter-tidal region between sea and land in the tropics and subtropics, mangrove forests play a vital role in stabilising shorelines and providing protection against tsunamis, cyclones and other extreme weather events. Thus while the 1999 super-cyclone that hit the Indian coastal state of Orissa washed away several villages along the coast claiming over 10,000 lives, it spared many of the villages in and around the Bhitarkanika Wildlife Sanctuary – the second largest mangrove formation in the country. Likewise, there is evidence from Bangladesh where large-scale mangrove restoration made a substantial difference in mitigating the impact of severe cyclonic events. Several other cases where mangroves have helped reduce the devastation caused by cyclones and tidal waves have
also been noted. With regard to the current disaster, early observations that have come in from IUCN field staff and others in Sri Lanka and Thailand and also from the tsunami-hit south Indian states of Tamil Nadu and Kerala have reiterated this finding. Conversely, some reports from Thailand are now emerging that many of the tourist facilities in the hardest hit provinces of Phuket, Phang Nga and Krabi, were built on coastlines that were originally forest reserves.

The Indian Ocean region has some of the most important mangrove forests in the world. They are not only home to rare flora and fauna but also act as natural water filtration systems by preventing nitrates and phosphates from entering into the sea and salt from entering land. In addition, these forests play a key role in supporting the livelihoods of rural communities living along the coast. Other coastal forests and tree-dominated landscapes – for example, plantations of *Casuarina equisetifolia* and of palm trees (coconut, palmyra, date and areca) – also perform important ecological, economic and livelihood-support functions by acting as natural shelterbelts and windbreaks against soil erosion and saline winds, which if left unchecked can significantly reduce agricultural productivity and rural farming incomes in areas that are immediately adjacent to the coast. This is also true of the long eastern coast of Africa that was also hit by the tsunami.

While almost 40 per cent of the total global mangrove area is concentrated in Asia, the continent however, also accounts for the highest loss in mangrove area over the last decade. This loss has primarily been attributed to the large-scale conversion of mangroves for aquaculture and tourism infrastructure development. The countries that were hit hardest by the tsunamis – Indonesia, Sri Lanka, India and Thailand – were all among those that experienced a net loss in mangrove cover over the last ten years.

**Impact of Tsunami on Coastal Forests and Livelihoods**

Though it is far too early to provide any conclusive assessment of the impact that the December 26th tsunamis has had on the region’s mangrove and other coastal forest ecosystems, preliminary observations suggest that the ecological damage caused by it has been extensive, though varied from coast to coast. Tsunamis typically reach the shore with tremendous amounts of energy and can strip beaches of sand together with trees and other coastal vegetation. Although, as mentioned above, many mangrove stands and coastal tree plantations contributed to saving human lives by bearing the initial brunt of the tsunamis, it is possible that these were then destroyed or severely damaged. However, in some cases it has been reported that more mature casuarina plantations that were at least 20 feet tall successfully broke and survived the impact of the tsunami waves, while younger saplings planted over the last two years perished.

In places where vast tracts of pristine mangroves and other coastal forest ecosystems have been destroyed, it is anticipated that this will pose a severe long-term threat for the region not only in terms of forest and biodiversity conservation, but also in terms of the ability of the ecosystem to support local economies and livelihoods. In such
places, the local fishing industry will almost certainly be impaired, though at this stage it is difficult to estimate to what extent the damage will be. These places would also be exposed to the risk of increased salinity, which in turn could affect agricultural production.

In areas such as the ecologically-fragile Andaman and Nicobar Islands – where severe ecological damage has been reported – the effect could be far worse. Home to some of the world's last remaining hunter-gatherer tribes, the damage caused to their habitat of inland estuaries and coastal mangroves could place these endangered indigenous people at grave risk, even though they are reported to have survived the original tsunami event itself. Moreover, if salination on the islands is deep and widespread it could potentially leave the soil on them less able to support vegetation, which in turn could significantly increase their vulnerability to the risks of further erosion, the impacts of climate change and food insecurity.

While early observations suggest that not much harm may have been caused to terrestrial wildlife in forest protected areas located along the coast, it is likely that trees, vegetation cover, fresh water sources, forest boundaries, roads and other physical infrastructure in these areas may have been severely affected. For example, in Thailand alone, 12 national park offices are reported to have been damaged together with many of the staff dwellings and other infrastructural facilities. There is also a possibility of salination of forest soils in some of the affected areas. Where this is the case, it can pose high risks to forest survival and regeneration both immediately as well as in the long-term.

Forest areas that were located completely inland are not expected to be significantly impacted by the tsunami, though it is possible that the pressure on them for meeting the livelihood needs of the tsunami-impacted and displaced communities, and for future reconstruction and rebuilding efforts, may sharply increase. This is a scenario that holds true for all forests throughout the affected region, including the remaining standing mangrove and coastal forests, which are commonly used for boat-building and house-construction purposes in Asia as well as in Eastern Africa. These impacts will therefore need to be carefully managed over the coming rehabilitation and reconstruction period.

What IUCN is doing

In the immediate aftermath of the tsunamis, IUCN focused on supporting humanitarian efforts in many affected areas. One of the main challenges facing the tragedy-struck nations will be that of restoring basic living conditions and livelihoods of the coastal poor, whose main source of income is derived from natural resources. It is essential that rehabilitation options take this aspect into consideration and that they include longer-term policy measures which can reduce the probability of such impact in the future, as well as rehabilitate the natural coastal protection barriers such as mangroves and coral reefs (see also the statement of 5 January 2005 released by the IUCN Marine Programme), thereby reducing the vulnerability of coastal communities.

IUCN's attention is therefore now focusing on the assessment of
damage to the natural environment and rehabilitation efforts. Rapid assessments will be used to gauge the impact of the tsunamis on the ecological systems of the region and consequently to assist communities and government agencies in projects for rehabilitating coastal forest areas. The studies will also identify other research needs that can support environmental restoration, coastal planning and rehabilitation policy over the coming weeks and months.

Through its member organizations and global networks of scientists and experts, IUCN will support governments, agencies and other organizations in their efforts to rehabilitate the affected areas, taking into consideration the importance of healthy ecosystems for maintaining peoples’ livelihoods. In particular, IUCN will focus on three aspects of work:

- Assessment of the ecological damage and the need for rehabilitation/restoration and to set up effective assessment systems, including an effective tsunami-warning system in the Indian Ocean region
- Prioritization – IUCN will use the knowledge gained from the assessments to help affected countries define priorities for rehabilitation
- Support the implementation of rehabilitation programmes for natural resources and ecosystems in the region.

The use of remote sensing techniques to assess the situation over larger areas is also being explored with NASA. A coordinated approach to generate and disseminate the needed information is sought through partnerships and consultations with governments in the region as well as other key agencies involved in both the humanitarian and environmental response to the tsunami, such as UNDP and UNEP.

Updates, results and information from surveys will be sent out to governments, state agencies, the media and civil society organizations at regular intervals over the next months.

For more information contact:

Stewart Maginnis, Head, IUCN Forest Conservation Programme, Gland, Switzerland
Tel: +41-22-999 00 01 stewart.maginnis@iucn.org

Guido Broekhoven, Coordinator, Regional Forest Programme for Asia, Bangkok, Thailand
Tel: +66-2-662-4029 ext 120 guido.broekhoven@iucn.org

John Kidd, Global Communications Coordinator
Tel: +41-22-999 0201; Mobile: +41-79-417 4049 john.kidd@iucn.org

Denise Jeanmonod, Asia Communication Coordinator
Tel: +66-2-662 4061 ext 108; Mobile: +66-1-925 0726 denise@iucnt.org